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A Family Affair

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COMMONWEALTH OF VIRGINIA



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Cover

This month's four-color cover brings into focus the striking coloration of the black crappie feeding on its favorite food, the minnow. This fighting panfish of the westerly state waters makes up a goodly part of the bass fisherman's catch. It can be told from its cousin, the white crappie, by the number of dorsal spines; the white having 5 to 6; the black having 7 to 8.

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Do hawks, squirrels, snakes and other predators deplete songbird populations? What does horned owl predation on quail suggest? A distinguished biologist lifts the curtain on an old, old controversy with

A Closer Look at the Killers

By PAUL L. ERRINGTON *

IN desert or ocean depth, on mountain top or steppe or fertile prairie, in lake or stream or marsh or forest or cave, life follows patterns of encroachment and adjustment that certainly were established in their broader outlines long before man was present to concern himself about them. Apart from the refinements evolved by man, life is mainly a process of unimaginative exploitation from the exploitable, with the participants living as they can.

The known details of this exploitation are so varied as to discourage generalizing, and I shall not try too hard to do so. Rather, I shall write of those animals that we call predators. I shall write of them not only because of the many years of my own professional studies that have been devoted to them but also because of the durable misconceptions of predation that still carry over in public thought.

It is unfortunate that man, the specialist in evil, sees in predation among wild animals so much evil that isn't there. Predation as a phenomenon is as nearly worldwide as any way of life followed by organisms. It is the *only* way of life that multitudinous animals—from microscopic protoza up to the great whales—are adapted to follow at all. It fits very naturally into the old, old patterns, of life being maintained somehow, when, and where, it can be.

The moth larva that bores through an apple isn't doing anything so much different from what a wasp larva may do in the body of a caterpillar or what a robber fly does when it pokes its mouth parts into a grasshopper. The reindeer browsing on a tundra doesn't succumb to temptation when it eats the eggs in a duck nest—it is just eating. The raccoon eating gallen plums has no reason to think that it shouldn't eat the newborn litter of rabbits that it may find at the same time—or to dig crayfishes out of their holes or to pursue a crippled bird that doesn't want to be caught.

We may have turkeys feeding upon large insects—and also upon small snakes if they can catch them, or possibly upon the eggs and fledglings of small birds. Or

the predation may be highly specialized, a species of predator living exclusively upon one species of prey. The Everglade kite has a beak enabling it to extract a particular kind of large snail from its shell. The goshawk has some specialization in its short, rounded wings, by which it can "sprint-fly" through brush in pursuit of a dodging bird, but it also can and does prey upon mammals. Unlike the goshawk, the peregrine falcon is adapted for swift and sustained pusuit through open air and seldom, if ever, catches its prey in brush or on the ground. The great horned owl is a very general feeder upon nearly everything catchable from insects and spiders to skunks and geese, yet no one examining its soft flight feathers would call it an unspecialized bird. Likewise, the wonderfully keen noses of members of the weasel and dog families may be considered a real specialization for their ways of living, irrespective of how general their food habits may be.

In considering predation as a phenomenon, it should not be forgotten that the animals pursued, or preyed upon, have adaptations as well, and that many of those suffering the heaviest predation have lived with their predators for some millions of years—and not solely because of their own high breeding rates! Wild animal predators are by no means always able to take their prey exactly as they may wish. Except for the most special of special cases, the records from careful investigations have brought out over and over again that the one big thing that determines what shall be preyed upon is *availability*. Nature shows scant favoritism in dealing with her creatures. The exploitable is exploited by about whatever can do it.

For extremely abundant small forms—teeming populations of insects or fishes, sometimes of mice, lemmings, rabbits, etc.—availability may mean their local or regional, abundance. As long as these great abundances prevail, practically all animals having appetites and the ability to capture these "prey animals" can take them virtually at will. Upon the larger or less numerous animal life, predation may or may not be so closely dependent upon abundance, but it is still linked with availability of prey.

We can recognize, of course, that animal life feeds upon something or it doesn't keep on living, and, if that "something isn't plants, it has to be animals. But, what about the sorts of predation that come close enough to

* Dr. Errington, a professor of Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa, has had a long and successful career as a research zoologist. He is an authority on the ecology of wild gallinaceous birds, waterfowl, and furbearers; the food habits of bird and mammal predators; the effects of predation; and cycles in animal populations. One of Dr. Errington's most important contributions to the scientific literature about predators is, "Predation and Vertebrate Populations," The Quarterly Review of Biology, June and September issues, 1946. This article appeared in the Jan.-Feb. issue of the Audubon Magazine and is reprinted with their permission.



Hal Harrison from National Audubon Society

We need not delude ourselves that all red-tailed hawks are after rats, because poultry is taken when available, but AVAILABILITY is the greatest factor affecting practically all predator diets.



Karl H. Malawski

No animal suffers more downright severe "natural" killing, or predation in relation to their numbers than do weasels, and they are themselves killers or predators.

us personally to arouse questions as to whether we would intervene, and, if so, how much?

If we live in town, we may know that the owl-roosts in the pine or cedar grove have bird remains under them and that those remains include more than the unwanted starlings and house sparrows. A sharp-shinned or small Cooper's hawk may wrestle all over your lawn with a flicker that is almost too strong for it to manage, and then the hawk may sit there with outspread wings, taking bits out of the struggling victim. A squirrel may be seen carrying away something fluffy that is *not* an acorn, or a bull snake with bulges along its sides may lie under the bushes while the neighborhood birds flutter around it, or our pet chickadee may no longer show up at the suet, or there may be piles of feathers that we can't fully account for but we suspect . . .

If we live in the country, we may note that a red-tailed hawk is interested in our poultry yard, and we needn't delude ourselves that it is after a rat if it can get its meat-hooks into one of those expensive fries! There may be raccoon or opossum or skunk tracks in the dust behind the coops. There may be a covey of nine bob-whites coming to the buildings during a late January snow and only five when next we see them. Something predatory may be visiting the mourning dove nests in the grove, or we may see a snapping turtle feeding on a duck down at the pond, or the grouse or pheasants or rabbits or squirrels may never become anywhere nearly as numerous as we may think they should.

A distinction should be made before we go further: domesticated species can be so inept about protecting themselves or escaping predators that predation upon them falls in a very different category than predation upon the usual run of nature-tested wild mammals and birds. The poultryman has as much real cause as anyone to worry about losses he may suffer from predation, but even he may often greatly reduce his losses without much if any direct campaigning against the predators. Perhaps this may be accomplished through intelligent selection of a location or through improvement of housing, perhaps through something as simple as keeping an active dog to scare away foxes or providing shelters for chickens to run under if attacked by hawks. An en-

lightened game breeder I know, whose pheasant pens were being raided by eagles that he was most reluctant to kill, stung the eagles with small shot at long range until they learned to stay away.

A tremendous amount of field research has been done on a number of North American wild mammals and birds. The resulting literature has brought out substantial evidence that looks incompatible with several of the earlier concepts of predation as a factor limiting populations of prey species. I shall not undertake the impossible task of discussing the newer evidence thoroughly or critically in a short article, but I should outline visible trends.

A major difference between predation in which one animal limits the population of another by preying upon it, and predation that is centered upon a population surplus, may be pointed up by an analogy. If cats, dogs, chickens, pigs or rats drank the milk within a milk pail, or contaminated it, such would have a quite different significance in dairy production than if they merely cleaned up milk spilled on the ground from a full pail. These are about the differences we find in studies of the effects of predation on animal populations in nature. Some predation *can* cut into populations, with the net result of there being fewer prey animals maintaining themselves. This may be conspicuously the case when the predator is an enterprising exotic, or introduced animal, with which its prey lacks experience. On the other hand, a surprising amount of predation upon our favorite game species or songbirds is upon "spilled milk," which has no real chance of being other than wastage, whether it is eaten by flesh-eaters or not.

For at least those common mammals and birds that have definite ideas as to property rights and the degree of crowding that they will put up with, their populations and rates of annual increases may be more or less self-limited. The fights between robins on the lawn, much of the singing or calling birds during their breeding season, the pulling off of coveys of quail by themselves, and the many demonstrations of intolerance on the part of this or that species can all signify with varying degrees of emphasis something that, as realists, we should try to remember: *Essentially, there is room only for*

about so many of what the animals behaviorists call a "territorial species," in a particular area, at a particular time.

The "threshold of security," or supporting capacity of an area for a territorial species, should properly be thought of in a relative sense. Its value expressed numerically, may differ with the year, and with the time of year, and, in addition, with the state of the environment. For our long-studied bob-whites, grouse, pheasants, and muskrats of the North-Central States, *threshold values, or supporting capacity of environments, have seemed to be generally lowest during or near the years ending in ones and twos. Just what is behind these and many other "cyclic" manifestations we don't know. During a given year, threshold values tend to be highest in late summer or early fall, after the breeding season is over; lowest in spring, with the onset of a new breeding season and its new tensions and intermediate in winter, when the habitat is neither so comparatively unrestricted as in late summer and early fall, nor so full of assertive competitors, as in spring.

There are deadly climatic emergencies—sweeping die-offs, etc.—but the factors that genuinely govern populations may still operate with a good deal of constancy. The "ceilings" of individual bob-whites or muskrats to be accommodated in an area may remain very similar for years at a stretch, and the year-to-year population responses may then follow mathematical patterns. Especially informative is the frequency with which a prey population may increase in conformity to a definite curve, with little or no deviation that can logically be attributed to variations in kinds and numbers of predatory enemies nor to actual predatory pressures upon the prey. These instances illustrate the fundamental independence that many prey species may show toward predation as a limiting factor even when the predation may account for colossal numbers of individuals or of large proportions of the prey populations.

Almost anyone who carries on intensive life history observations of common mammals and birds may find them preyed upon, sometimes quite severely, at immature stages. As I saw my litters of muskrats, marked for later identification or broods of quail or pheasants or ducklings shrinking away, and at the same time, saw their remains at the feeding places and in the droppings and pellets of local predators, I could understand the feeling of despair that people might feel while witnessing losses suffered by species in which they had special interests.

But whether anything is done to give the species preyed upon added protection or not, I see no justification for the emotional intemperance that one creature, killing another, often arouses in people. After all, the broods of small to medium-sized hawks and owls that I have worked with shrank away in a similar manner. Why is it so widely believed that predators don't have their own losses from predation? In fact, I don't know of anything that suffers more downright severe "natural"

killing, or predation, in relation to their numbers than do weasels. Still, if weasel numbers are controlled by this predation, it would seem to be mainly in the poorer environment for weasels. In their better environment, weasel numbers appear to be determined more by the limits that weasels tolerate among themselves than by what may or may not prey upon them.

In analysis, predation upon most well-studied species of wild mammals and birds is borne notably by parts of populations that try to live under a handicap. If discovered by a predator, an unguarded clutch of eggs or a helpless litter is more vulnerable than the young that can scamper off and hide, and the less advanced young are more vulnerable than the strong fliers and runners or the ones that can fight back. Predation upon such ailing, weakened, or crippled individuals as we may loosely term "the unfit," does occur, but most of the thousands of victims of predation that I have handled had the appearance of being physically normal for their ages. One who looks for obvious physical handicaps in the animals preyed upon may expect to find them only now and then. Exceptions may be those prey species that happen to be all but immune to predation. Even so, among these, the very young, the very old, the very ill, or the very unlucky, may not escape predation.

Handicaps imposed by circumstances may so often underlie availability to predators that it may be hard to find examples of victims that clearly were *not* members of biological surpluses or of parts of populations evicted by poor environments or environments already filled to capacity with their own kind, or otherwise made vulnerable by emergencies. When there is, in effect, a place for only about so many individuals of a species to live—for reasons of either or both environment limitations or psychological peculiarities of the species—and when more than that number try to live there, tragic events have ways of befalling the excess populations.

In animals as dissimilar as bobwhites and muskrats, predation may be invited by overflows of populations into unfavorable habitat or by increased tension and friction in the social structure, even of individuals occupying the best habitats. Remains of the dead and "sign" of wholesale murders may be scattered about the landscape for a time. But, after nature's period of shaking down to comfortable or manageable population limits is over, both the bobwhites and the muskrats may live with remarkable security for months, even in the presence of large numbers of such formidable predators as horned owls in bob-white range and minks in muskrat range.

With increasing knowledge of these natural interplays, one can hardly avoid being impressed by the automatic ways in which they work—always within the rules of order imposed by protoplasm and its environment. Common predators switch from one type of prey to another, in keeping with the outstanding role of availability which determines their food habits. Common prey animals, in their turn, show many types of

* Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

Common Sense and Mushrooms and Toadstools

By J. J. SHOMON

DELICIOUS wild mushrooms can be found almost anywhere in our fields and woods and August's warm and wet days and nights mark the height of the mushroom season. Although a good-eating variety can be successfully cultivated, the choicest kinds cannot be hand-grown or purchased and are only available from Nature where anyone can freely pick them.

Mushrooms are very often shunned by many Americans because of the prevalent warnings from a number of sources "to leave all wild mushrooms alone." While there is a good reason for caution in approaching these strangers of the fungi world, we must at the same time exercise common sense and not avoid all acquaintance with these interesting and unusual forms of plant life.

What is a Mushroom?

And a plant is exactly what the mushroom is. What we see in the mushroom above ground, however, is only part of the plant, the so-called fruiting body. The rest of the plant or fungus is below ground and is made up of a fine network of threads, mostly invisible to the naked eye, which aids in the process of decay of organic matter.

Unlike green plants, however, which can manufacture their own food, mushrooms and fungi must obtain their food from living or dead plants and animals. A fungus living off living matter is called a *parasite*, while one living off dead matter is called a *saprophyte*. Most of our common molds and mushrooms are *saprophytes*. Without the wonderful work of fungi in the world our

planet would soon turn into a biological desert.

What is a Toadstool?

The term "toadstool" is not a good name because to most people who know little about fungi all mushrooms good and bad are included in this class, a name suggesting danger and poison and other terrible things smacking of witches, and darkness and thunder. Toadstools, properly speaking, should include only the poisonous species, and these are not too many.

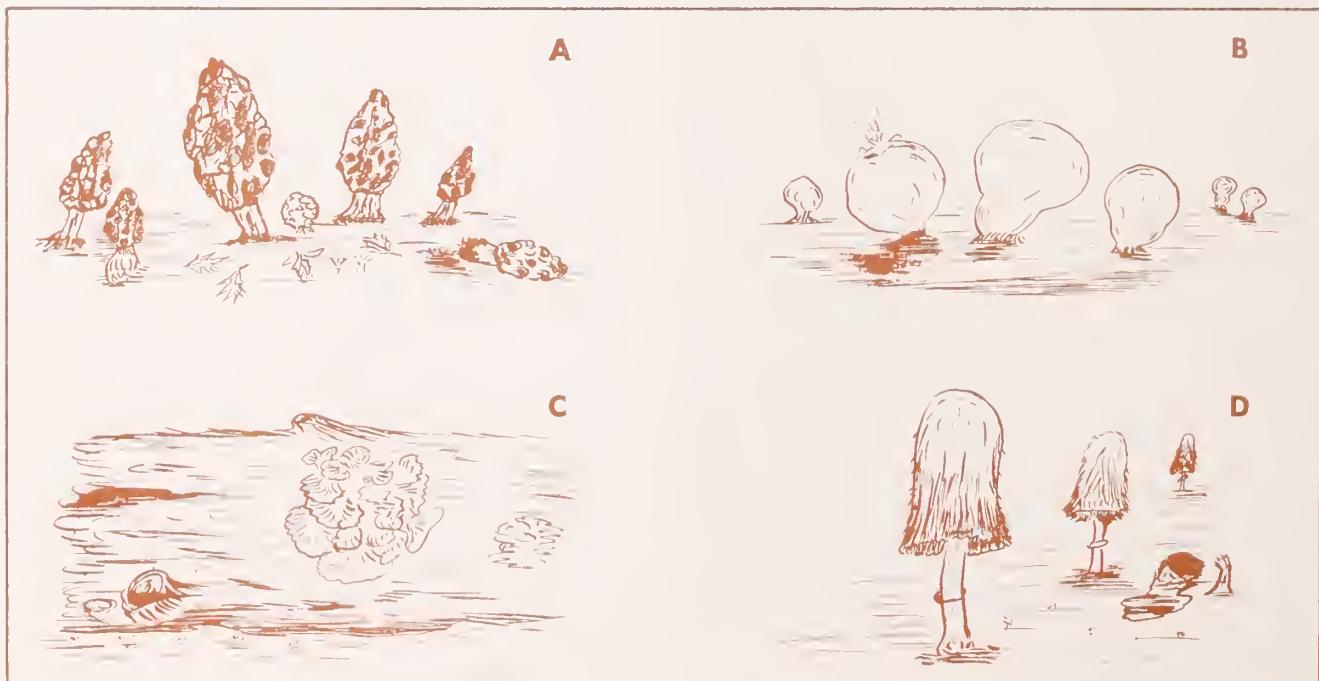
For the amateur, if he will learn to recognize one genus, the *Amanita* group or death cups, much of his fear can be eliminated. Most cases of mushroom poisoning can be traced to this group, particularly the dangerous *Amanita phalloides*, which causes a degeneration of nerve and gland tissues with usually fatal consequences.

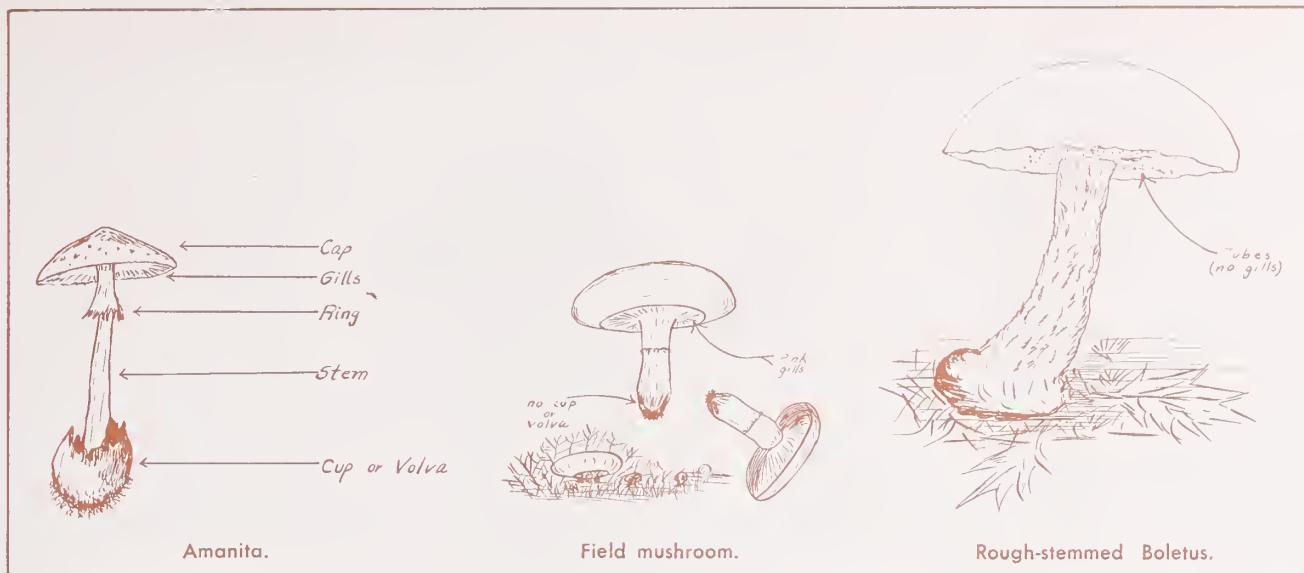
Of course there are other mushrooms which are poisonous and which can cause sickness and death but they are fairly rare and are not often collected because of their small size and unfamiliarity.

Toadstool Poisoning

Human poisoning due to eating toadstools is not too common in this country and fairly rare too in the countries of Europe where great quantities of mushrooms are gathered. According to scientists who have made a special study of poisonous fungi, different species react differently on the human body. Some cause paralysis of nerves, some destroy gland tissue, some react on the blood. Others may cause serious digestive disturbances. Some too are extremely insidious, like *A. phalloides*

- (A) MORELS are peanut-shaped, cane-like mushrooms resembling tan sponges. Common in woodlands, they are unexcelled when cooked.
(B) PUFFBALLS of fields and pastures should be gathered only when white and firm inside.
(C) SULPHUR SHELF mushrooms are found on rotten logs and dead trees. This orange-yellow mushroom usually appears in the fall.
(D) The general shape of the SHAGGYMANE is the best identification feature. It belongs to the edible inky-cap group of fungi.





which doesn't show its symptoms until long after being eaten and after much damage is done.

Treatment for toadstool poisoning is varied, complex, and not always successful. Some progress in finding antidotes is being made, particularly at the Pasteur Institute in Paris where an anti-phalloidian serum of considerable value has been developed. The best advice that can be given, however, is to rush the victim to a doctor or hospital and administer purgatives and an enema.

According to the U. S. Public Health Service no records are on hand giving the number of persons dying yearly from toadstools. The guess is—and this upheld by the U.S.D.A.—that the number may run from 1 to 20. In Virginia, there is no record on hand at the Department of Health of any person dying or becoming ill due to fungi consumption. This, of course, doesn't necessarily mean that none have occurred but that no cases have been reported.

The Good from the Bad

There is only one safe way to collect mushrooms for the table, and that is to *learn all you can about the features of the species you plan to eat so you cannot mistake it for any other*. There are well over 1500 species of mushrooms in America and there are many exceptions to every rule of identification that has been made and no rule of thumb can apply. Only by positive identification can you be safe. If you know and recognize a species which has proven edible, then you can be safe. But no home rule, such as testing with a silver spoon, or taste, is reliable.

I have followed mushroom trails all my life and have studied fungi from a botanical standpoint for many years, yet I would not dream of eating unfamiliar mushrooms unless I had learned to identify them positively from some mycologist or reputable woodsman, or seen them prepared and eaten.

The best way to identify mushrooms and toadstools is to learn as much as possible about them from reliable, well-illustrated books, then go into the field with an expert and learn to identify certain groups. Like the

study of trees, flowers, birds, and anything else, identification does not come easily, but must be gradual and constant. Yet, if the interest is there, it is surprising how many different species one can learn in a single season.

For those who like to eat mushrooms and love to wander in a damp woods for August offerings, I might suggest that the following rules be strictly adhered to:

- 1) Begin by learning to identify only a few of the simple well-known edible mushrooms, and leave all others alone. A good start would be the four species known as the "Foolproof Four:" Morel's or sponge mushrooms; the puffballs; the sulphur shelf mushrooms; and the shaggy-manes. All have definite characteristics that positively distinguish them from doubtful, inedible, or dangerous species and even from other edible kinds. Space does not permit any detailed description of these groups, however, good books such as "Edible Mushrooms" by Clyde M. Christensen, or the "Mushroom Handbook" by C. C. Krieger, or "Mushrooms of Eastern Canada and the United States" by Rene Pomerleau, or any bulletins put out by state

- 2) The next rule might be that the common so-called cost distribution—will describe these groups adequately. experimental stations, as well as the larger public museums of natural history—available for free or low rules of testing good and bad mushrooms be best forgotten. There is no safe rule by which the edibility of a mushroom can be tested once it is prepared for the table. Positive identification must be done in the field through recognition, spore prints, and other established botanical means, as this is the only thing that is reliable in the long run. A person must become thoroughly familiar with the characteristics of fungi such as color, appearance of stem, ring, gills, cap, et cetera; and whenever in doubt about any species or a certain individual specimen, never attempt to include it with others for food.

(Continued on page 22)

How Are We Doing in Fish Management



Commission photo by Bowers

By R. W. ESCHMEYER *

THE PICTURE of present-day fish management can best be presented by reviewing, briefly, the history of its development. To many of us History is a dull subject. However, there is nothing dull about the story of the gradual development of fish conservation. The leading roles in this drama are played by three type-characters: the angler, the politician and the biologist. The first of these characters wants something, the second tries to give him the things he wants, and the third tries to find out what the principal character should be getting.

The future of fish conservation depends on how each of these characters plays his part in the years to come.

In the early days it gradually became apparent that some regulations were needed to conserve the supply of fish. It was found that spawning runs could be depleted. The early regulations were based, generally, on the assumption that each fish must be permitted to spawn at least once. Size limits and closed seasons at spawning time were among the major regulations imposed on fishing.

Enforcement machinery was needed to see that these laws were obeyed. This called for a central administrative set-up in the state, and for local enforcement men, who were usually given the title of "warden."

These jobs were filled by political appointees. There was a complete turnover in personnel with each change in the governor's office. Of course, if a warden happened to arrest a politically prominent violator, the arrest was

followed by an immediate individual personnel turnover.

Another item entered the picture. It developed into a craze. Folks discovered that some fish could be hatched artificially and others could be hatched in rearing ponds. Nearly every state started a hatchery program. This provided more jobs for political appointees.

Fish management now consisted of enforcing arbitrarily-made regulations and the indiscriminate planting of newly-hatched fish fry. The average state program was a simple one. The political appointees were able to handle the situation. The regulations themselves were made by the state legislature. Changes in the laws were usually made to comply with the wishes of the more vocal sportsmen.

If local anglers were dissatisfied with their fishing, a hatchery truck loaded with fry was dispatched to their favorite fishing waters. If more appeasement was needed, the legislature passed another law or two. Where anglers were quite persistent, a change in wardens or an increase in the numbers of wardens was thrown in for good measure.

The emphasis was on more of the same—more fish fry, more regulations, more wardens! There was only one thing wrong with this simple fish conservation program—it didn't help the fishing! This failure led to troubles for the politically-appointed administrators. Their job was to appease the anglers. But "appeasement" became increasingly difficult.

Anglers proposed a variety of remedies. Some wanted one regulation, others wanted a different one. There

* This talk was given by Dr. Eschmeyer, president of the Sports Fishing Institute, before the 31st Annual Convention of the Izaak Walton League of America, Grand Rapids, Michigan, June 5, 1953.

was disagreement on which species to stock. Some blamed the predators. Others attributed a decline in fishing to in-breeding. Nearly every angler had an answer, but the remedies proposed were varied and sometimes contradictory. Fishermen fought over which regulations should be imposed, creating serious political problems for the state legislatures. The state fishery administration was almost invariably in hot water because any step taken would be favored by some anglers and opposed by others.

Actually, this fighting between anglers played an important role in bringing about modern fish management! If they had not disagreed constantly we would still be limiting fish conservation to the methods used in the past. Because of their inability to appease the public, the administrators looked for new ways to keep the voters happy. In some instances the problem was turned over to hatchery men. They had a ready answer—we needed more hatcheries. Elsewhere, the wardens became experts. They had an answer, too—we needed more laws. The anglers, though, didn't accept the judgment of either the hatchery men or the wardens. They continued to disagree.

Finally, presumably in desperation, the administrators tried a new "gadget." In medicine, agriculture, engineering, and other fields, the universities were finding some of the answers. So, hiring a few biology professors in summer to study the fish conditions offered definite possibilities. Some states even employed a full-time biologist or two.

In this new science, the biologists couldn't get the answers immediately. But, they served a useful purpose. The administrators could send them to trouble spots, and could then indicate to the local anglers that the problem was being investigated. In many instances this had a satisfying effect on local sportsmen.

I well recall some of my early trouble-shooting efforts. In one instance the lake was well supplied with blue-gills but almost none were of legal length. The local club stocked heavily each year, so there was no danger of "in-breeding." I didn't know why they had only small fish in the lake. I'm glad I didn't know. If the sportsmen had been told that fishing was poor because there were too many fish, that the stocking did more harm than good, that the size limit was undesirable, and that fishing would be better if they destroyed many of the little fish, the trouble-shooter would very probably have been shot!

In time the biologists discovered some of the reasons why the old methods were ineffective. But they couldn't recommend substitute activities which would provide better fishing. They were in the unenviable position of the doctor who knows that an accepted remedy doesn't cure a certain ailment, but who knows of no real cure for it.

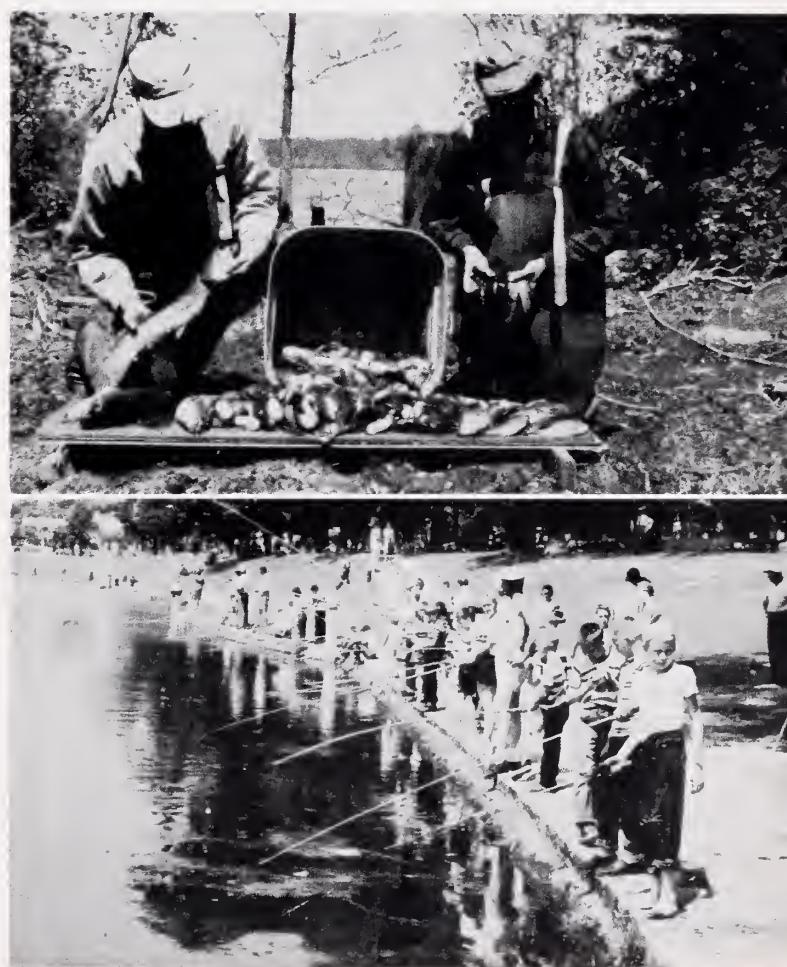
As time went on, the biologists made some important basic discoveries. Here are a few of the significant ones:

1. It was found that a lake or stream is really an aquatic pasture, having much in common with its dry-land equivalent. In our aquatic pastures, as in our land pastures, production is definitely limited. Furthermore, what is good pasture for some species is poor pasture for others.

2. Fish are extremely prolific. Under suitable conditions only a limited brood stock is needed to supply adequate reproduction.

3. Our harvesting equipment, the hook and line, is inefficient "machinery." Our lures must compete with the natural food. By hook-and-line fishing it is almost impossible to harvest so much of the crop that an inadequate brood-stock remains.

Once these basic facts (and many others) were learned, progress in fish management was rapid. Ad-



TOP: Fish are prolific. Under suitable conditions only a limited brood stock is needed to supply adequate reproduction. These catfish taken from Lake Drummond were stunted from crowded conditions.
Commission photo by Bowers

BOTTOM: Our harvesting equipment, the hook and line, is inefficient "machinery." Our lures must compete with natural food. It is almost impossible to over-harvest fish by this equipment.
Commission photo by Kesteloo



It was found that a stream or pond was really an aquatic pasture with its dry land equipment.

Commission staff photo

ministration was improved, too. When it became known that fish conservation was a complicated science, some states set up efficient administrative machinery, and turned the question of making regulations over to these experienced fishery administrators.

Professional fishery workers still don't have all the answers. But they have enough of them so that they can now use their fish management "tools" with considerable success.

At this point, perhaps we should explain why there are no dates in this brief history. The progress was not uniform—some "early" history referred to above, is also "recent" history. For example, one northern state still has an extensive personnel turnover with a change in administration. Here fish conservation is still a political football. Many wardens were still elected to office a few years ago in one southeastern state. In a number of states the legislatures still make the regulations. Some states had no formally trained fishery personnel even two or three years ago. In several eastern states where the fishery program is in the hands of elderly hatchery personnel, the trained biologists are tolerated only because of public demand. Here they are not permitted to check on the value of the trout stocking programs, which probably are badly in need of checking. It should be added that some ex-hatchery men, who have kept up with developments, are doing a good job of administration.

By disagreeing with each other the sportsmen brought about, indirectly, our shift to modern fish management

Now, once again, the progress depends on the sportsmen. The progressive fish conservation set-ups now have the know-how to do a good job. But, they can do it only with close sportsmen cooperation.

In the early days the sportsmen who "knew the answers" were responsible for the development of fish conservation. Today the individual who "knows all the answers" is a detriment to fish conservation.

The angler once again plays the leading role in the fish management picture, but the role now must be different from the one he played a few decades ago. It is important that the angler recognize and accept this new role. In this connection, here are a few specific suggestions for organized sportsmen:

1. Be sure you have a modern, progressive state fish conservation set-up, then back it to the limit and accept its judgment.

2. Insist that fish conservation be kept out of party politics.

3. Insist that the matter of making regulations be turned over to the fish and game division (or conservation department), and be taken away from the state legislature.

4. Where legislatures still make the regulations, insist that they follow the advice of the fishery personnel.

5. Insist that the state fish and game unit have effective research and education programs.

6. Help on those aspects of the program which are too big for the fish set-ups to handle, such as our siltation and pollution problems.

7. Organized sportsmen groups should conduct an active educational program among their own members. These groups can play their role well only if they are kept up on developments.

We could list many more suggestions, but the seven given are among the most important ones.

So, at this stage in our fish conservation history, the answer to the question "How are we doing in fish management?" rests with the fishermen themselves, and particularly with the organized sportsmen. Knowing this, I have been observing closely the "evolution" of the angler. Is he learning to play his new role in the conservation "drama?" The answer can be made without hesitation. In many instances, though not in all of them, he is learning to play the new role exceptionally well. This leads to a simple answer to the original question—"how are we doing in fish management?" In general, WE'RE DOING FINE!

VIRGINIA WILDLIFE

CONSERVATIONGRAM

Late Wildlife News . . . At A Glance

MORE THAN 50,000 DOGS DESTROYED IN VIRGINIA ANNUALLY: Despite the destruction of more than 50,000 dogs in the state of Virginia each year, the revenue from the sale of dog licenses continues to increase at a rate of 5% over each previous year. During the past year, state game wardens destroyed 40,025 dogs. According to estimates of the State Highway Department, more than 10,000 dogs are killed on Virginia highways each year. In addition, there is an annual traffic death total of 11,636 cats, 10,776 rabbits, 10,144 opossums, groundhogs and other miscellaneous wild animals, and 4,212 skunks—a total of more than 46,000 forms of animal life destroyed on our states highways each year.

DR. JOHN L. KASK RESIGNS AS FWS ASSISTANT DIRECTOR. Secretary of the Interior Douglas McKay has announced the resignation, effective July 7, of Dr. John L. Kask, assistant director of the Fish and Wildlife Service. Dr. Kask has accepted the position of chairman of the Fisheries Research Board of Canada, with headquarters located in Ottawa.

Dr. Kask became assistant director of the Fish and Wildlife Service on April 1, 1952, filling the vacancy created by the retirement of Milton C. James. Prior to that he had been chief of the Service's Office of Foreign Activities and assistant director of the Pacific Oceanic Fishery Investigations at Honolulu.

SUBJECT OF YEAR-AROUND FISHING BROUGHT BEFORE ADVISORY COUNCIL: A recommendation that all impounded waters of the state be open to year-around fishing was brought before the sub-committee of the Virginia Advisory Legislative Council at a meeting in Richmond May 26.

If this recommendation, submitted by Delegate Julian H. Rutherford, Jr., of Roanoke, is accepted, it will necessitate the repeal of a statute now in effect which establishes outside dates for fishing in Virginia, said I. T. Quinn, Commission executive director.

The Commission, which was authorized under a special act of the General Assembly in 1952 to enter into reciprocal fishing agreements with adjacent states, has already opened interstate impoundments such as the Kerr Dam Reservoir for year-around fishing.

According to Quinn, Virginia and Arkansas are the only southern states which have a closed season on bass. Naturally, said Quinn, Virginia fishermen are wondering if they are being penalized by these closed seasons for fishing.

COMMISSION PREPARING FILM ON BASS WATERS: Leon G. Kesteloo, Commission still and motion picture photographer, is now in the midst of filming a motion picture on the life-history of bass in Virginia and bass fishing. This film, when completed, should be comparable to Brooks and Rainbows, made by the Commission two years ago and which gained national recognition. The tentative title chosen for the new film is Bass Waters. Although the film is expected to be completed late this year, release prints will not be available until early in 1954.

Bugg's Island Lake and Kerr Dam

Virginia's largest and newest lake impoundment embracing 51,200 acres and 800 miles of shoreline—more water than all of Virginia's other ponds and lakes put together—became the answer to a 10-year dream of thousands of Southside Virginians when the new Kerr Dam and Buggs Island Lake were dedicated on June 13 and 14.

(Commission photos by Kesteloo)

Part of the crowd went to see the 144 feet high, $\frac{1}{2}$ mile long Kerr Dam. Ceremonies proper took place in Clarksville.



Speakers praise gigantic water control, power, and recreational project. (Left to right) Col. B. B. Talley, Army Corps of Engineers; Gubernatorial candidates Thomas B. Stanley and Charles R. Fenwick; State Senator S. Harrison, Jr.; and Representative Watkins M. Abbott.

Dedicated —

become the Inland Water Playground of Virginia



Miss Lu Long Ogburn, first annual Clarksville water queen of '53, poses with her court of 14 attendant princesses.



Former Virginia Governor and now U. S. representative William M. Tuck chats with Miss Ogburn, the queen, while Tammy Bartlett of the Florida water ski troupe looks on.



Water show, including water skiing and speed boat jumping was put on by Barlett's group.



An 800-mile shareline encompasses the lake designed for boating, sailing, and fishing.



Fireworks at night.



Mecklenburg's County Game Warden W. S. Crute looks over one of the cut-off roads to the lake.



And fishing is open the year-round. Fish biologists say fishing should steadily improve over next several years.

When Jamestown Was A Colony

By BARBARA BEATTIE FANNEY

OUT OF the quiet stillness of the past comes the weird bellow of an enraged bison and the frightful snarl of a lurking timber wolf. Ghostly sounds wafting from the past when Jamestown was a struggling English colony.

As the *Sarah Constant*, the *Goodspeed*, and the *Discovery* bucked the waves ever drawing closer and closer to Virginia, the startled crews saw whales and schools of porpoises glistening in the sunlight on Chesapeake Bay.

When the settlers disembarked at Jamestown, they found strange birds and animals, as well as Indians, to fill them with awe and dread. Of course, these men and women who journeyed to Virginia in 1607, and afterward, saw rabbits, squirrels, bear, deer, and other animals still common to us, but they also saw others which we can read about only in the pages of long ago history.

Since the coming of the white man to the North American continent, some seven species of animals and several varieties of birds have vanished forever from Virginia. A few critical game animal species have been restocked by the Game Commission, but many others will never be seen again by man outside of parks and zoos. We in Virginia, may never, like our forefathers, have the thrill of seeing wild bison roaming the western lands of our state, or of hearing the shrill, frightening scream of the cougar or panther as he stalked his prey in the darkened hours between twilight and dawn, or of watching the graceful passenger pigeon as it winged its

way across the skies.

Into the virgin forests of Virginia, untouched by civilization, came such men as Captain John Smith, William Strachey, Thomas Hariot, Thomas Glover, and the Rev. John Clayton, who penned a vivid word-picture of the Virginia of long ago. Although these 17th and 18th century writers were given to gross exaggeration in their written descriptions, we can still get a fairly clear picture of these animals and birds which followed the fading trails into history.

Let's turn back time nearly 350 years and look at the 17th century Virginia through the eyes of the first settlers.

If the settlers had watched carefully, they might have seen one of the Great Auks on its way south for the winter. This great flightless swimming bird, which vanished from the shores of America nearly 100 years ago, was supposed to have been the most powerful and swiftest diving bird ever found on the North American continent. The early colonists might also have glimpsed the gracefully circling swallow-tailed kite, often compared to a swallow in slow motion, flashing its beautiful iridescent black and white plumage as it dipped its long forked tail in flight.

The settlers were amazed by the vastness of the land and the extreme richness of the soil and the almost unbelievable numbers of birds and animals around them. In Captain John Smith's own words, "*the vesture of the earth in most places doth manifestly prove the nature of the soyle to be lusty and very rich.*" In describing the New World animals and birds, these early writers almost invariably gave a list of species, most still common today, which they had seen, then would speak of "wild beastes unknowne" and birds "to vs unknowne by name."

In the "lusty" and "rich" soil, these daring adventurers found all manner of fruits and berries growing abundantly. After sampling some of the strawberries, mulberries, and red and white plums known to them, one of the hungrier ones popped a pretty little green fruit



into his mouth, and grimaced painfully as his mouth puckered with its bitterness. Captain John Smith described so aptly the fruit which this unsuspecting settler had so eagerly bitten—a persimmon. “*The fruit is like a medlar; it is first greene, then yellowe, and red when it is ripe: if it be not ripe, it will draw a mans mouth awrie with much torment; but when it is ripe, it is as delicious as an Apricock.*”

As the settlers began their job of building homes and planting the fields of the new colony, many strange birds caught their eyes. The first of those mentioned in early literature was a crimson-winged blackbird, described as “blaekbirds with red wings.” Many saw the moeking-bird, the blue bird, the hummingbird, the blue jay.

So numerous were the bear, deer, turkeys, and water-fowl that all of the early writers of the period apologized for their seeming exaggeration in describing them.

One of the most often described birds was the wild turkey, a native of this country which had been taken to Europe for domestication by the early 15th century Spanish explorers. Early colonists were overwhelmed by the fabulous numbers of turkeys seen. Captain John Smith, promptly in 1607, named a small island in the James just above the new colony, “Turkey Isle.” William Strachey, in writing of the first days of the colony, said: “*Turkeys there be great store, wild in the woods, like pheasants in England, forty in a company, as big as our tame here, and yt is an excellent fowle, and so passing good meat, as I maye well saie, yt is the best of any kind of fowl which I have ever yet eaten there.*”

In addition to the food value of the turkey, America’s largest upland game bird, the colonists found the bird to be valuable to the Indians in other ways. Much to their astonishment, they saw the redskins using the spurs of old turkey gobblers as points for their arrows, and the feathers for making cape-like garments.

Waterfowl in those days were super-abundant. Thomas Glover remarked that on “*the Bay and Rivers feed so many wild fowl, as in winter time they do in some places cover the water for two miles; the chief of which are wild Swans and Geese, Cormorants, Brants, Shield-fowl, Duck and Mallard, Teal, Wigeons, with many others.*”

One night, a strange little parrot-like bird flashed before the eyes of William Starchey, one of the fortunate few to get a glimpse of the Carolina Paroquet—a strictly nocturnal little creature. “*Parakitoes I have seenne . . . They be a fowle most scift of wing, their wings and breasts are of a greenish culour, with forked tayles, their heade, some crymson, some yellowe, some orange.*

tawny, very beautiful.”

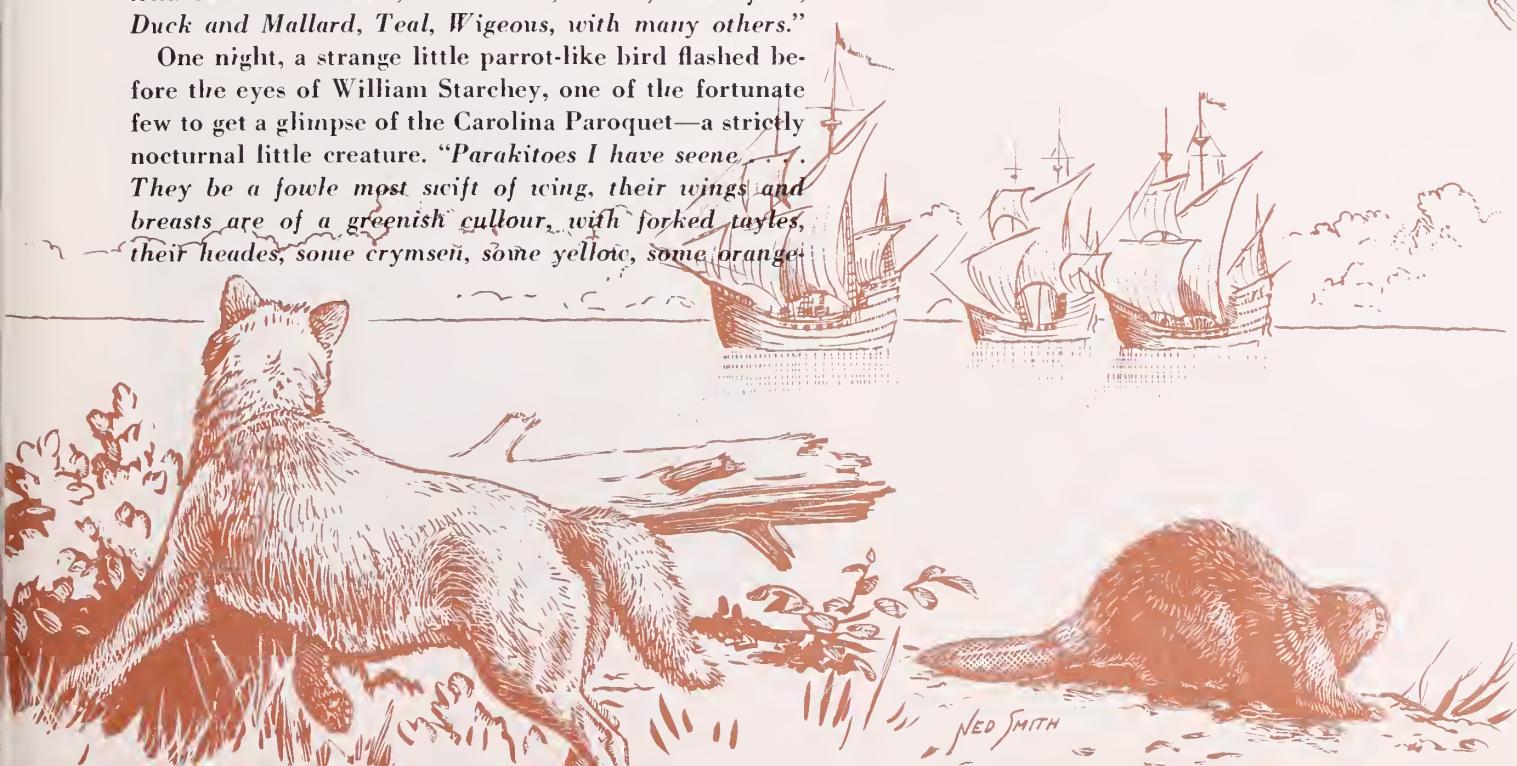
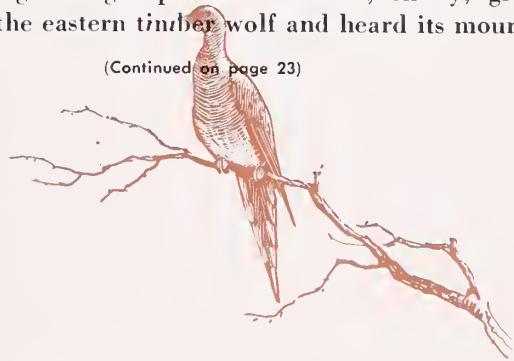
Evidently Starchey did not know of the damage these tiny creatures were to cause the colonists. Colonel William Byrd, in the 18th century, wrote of this beautiful bird no longer seen in Virginia skies: “*Very often, in Autumn, when the Apples begin to ripen, they are visited with Numerous Flights of paroquets, that bite all the Fruit to Pieces in a moment, for the sake of the Kernels. The Havock they make is Sometimes so great, that whole Orchards are laid waste in Spite of all the Noises that can be made . . . They rarely venture so far North as Virginia, except in a very hot Summer, when they visit the most southern parts of it. They are very Beautiful; but like some other pretty Creatures, are apt to be loud and mischievous.*”

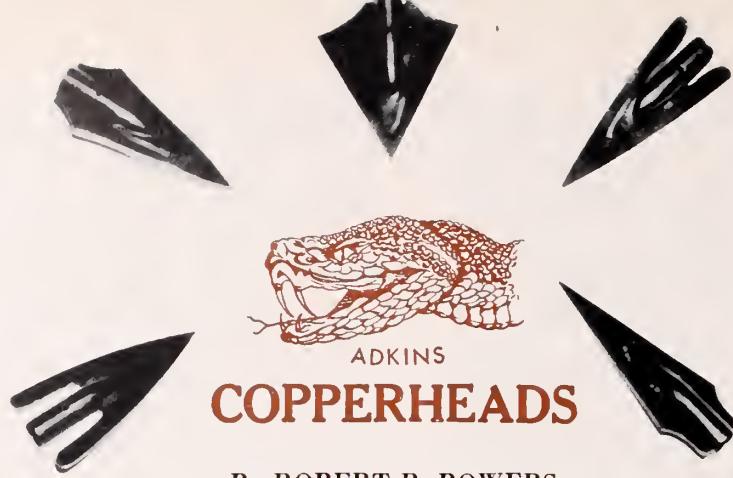
Another bird which caused much astonishment and also some destruction of crops was the passenger pigeon. As one early writer said, “*Flights of pigeons in breadth nigh a quarter of the mid-hemisphere and of their length was no visible end; whose weights brake down the limbs of large trees thereon they rested at nights, of which the fowlers shot abundance and ‘em.*” This dainty little pigeon winged its last flight over Virginia many years ago only to vanish completely in 1914.

Now extinct in Virginia, the puma or panther with its long, lithe body, broad, rounded, and rather small head, long tail and soft yellowish brown or tawny body, must have startled many a settler with its frightful screams during the early days of civilization in Virginia.

Wakeful settlers who roamed abroad at night frequently caught a glimpse of the dark, slinky, gray shadow of the eastern timber wolf and heard its mourn-

(Continued on page 23)





By ROBERT R. BOWERS

Commission photos by Kesteloo

A TUMULTUOUS bellow of a masterful wild bull elk broke the stillness of the silent dawn. The tense figure of a man stood blending with the mottled background of the green pine forest and the dead grown grass. The hunter lifted a flute-like bamboo tube to his excited lips and returned a challenging roar to the big animal. Whether from rage or from reassurance, the elk came closer and closer to the stand, then bellowed once more. The man again returned the call, but knowing that soon the elk would be at the woodland edge, in sight of his stand, he laid down the caller and picked up his bow. Quietly slipping a steel-tipped arrow from his quiver, he made ready for the kill.

Soon the majestic antlers of the bull's rack glistened in the first rays of the rising sun. It stood there some 20 short yards away, poised as if in challenge to the unknown intruder. Lifting its head skyward, it bellowed again, then stood staunch, as if waiting for reply.

Shaking a little, the hunter's anxious body tightened and his arm muscles bulged as he strained back the string on his 70-pound bow. He took nervous but certain aim at the left front quarter. The bowstring sang from a sudden release of power. Like the silent, deadly bite of the copperhead snake, the razor-sharp arrowhead hit true and ate deep into the left front shoulder of the huge elk. Its giant hulk lumbered sideways, quivered for a moment, and then with one last surging bellow, slumped forward, dead at the hunter's feet.

Gus Adkins, a Richmond City Arrowsmith, has the bamboo elk-call used to call the big animal to the hunter, but Jerry Hill, the Boise, Idaho, hunter who killed the elk would not part with the arrowhead he used to drop it. Though a product of Adkin's handiwork, Hill just couldn't part with the steel arrowhead, for it was going into his collection of prized possessions.

Such stories of elk kills in Boise, cougar kills along the Salmon River, deer kills in Michigan, and many more are told these days the world over, all because a man in Richmond, Virginia, was not able to get arrowheads to suit him back in 1930. It was then that Gus Adkins decided to make his own points. Since he began his hobby 23 years ago, a quarter of a million *Adkins Copperheads*, the trade name for his arrowheads, have found their way into 21 foreign countries and all of the 48 states. Bastmans, the largest department store in

Sweden, now carries the Adkins product along side Winchester's, Remington's, and Heddon's Sons sporting equipment. And people must be satisfied, if repeat orders are any indication, for many of Gus's customers were among the first users of the Adkins arrowheads back in the early thirties.

Daily orders come in from such far off lands as the Belgian Congo; Shanghai, China; Barcelona, Spain; Stockholm, Sweden; Mexico; Canada; Scotland, and many more, Gus even barteres with some western American Indian tribes, exchanging arrowheads for hand-woven shirts and bead-work.

But despite the increased demand, Adkins refuses to be rushed. He says that his reputation was made on quality, not quantity, and he will not sacrifice one for the other just to meet the demand. He claims that he makes the *best* arrowheads in the world, not the most.

The steel used in these arrowheads is rolled by a mill in Boston, where for many years some of the finest steel has been turned out under Swedish patents. Gus describes this metal as "band-saw steel rolled to razor-hardness." His brazing process whereby the arrowheads are attached to the arrow cap is also exclusive with him. The heads are brazed together with silver alloy, which Gus claims "is the strongest means of joining two metals together known to science."

Gus takes great pride in his letters of commendation, Gus Adkins uses a punch press to stamp out heads from finest steel under Swedish patent.



sent to him by users of his product. And these letters give proof that his arrowheads are made to drop elk, cougar, deer, and almost any other hunted animal.

There is Bob Donley, who has stalked and killed six large cougars along the South Fork of Salmon River in Garden Valley, Idaho, with the Adkins Copperhead B-3, on his arrow tip. To him there is nothing like this sleek blue-steel head. After three cougar kills with one B-3, Donley sent the head to Adkins for his collection.



After brazing, heads are ground to razor-sharpness on a grinding bead in Gus's workshop.



Packaging for mailing is a big job for Gus, with each arrowhead getting individual attention.



Gus displays his prized cross-bow, now illegal for hunting, which can kill a deer a city block away.

Wesley and Alma Blundell, a Lakeside, Michigan, couple, annually stalk deer with bow and arrow in Newaygo County. Wesley is Northlands male archery champion, with Alma, his wife, holding down the women's championship in field archery. Wesley returned nine straight years with a buck to the credit of an Adkins arrowhead, B-2, whereas, Alma, is catching up fast with her prize buck killed last year, making three in a row.

And with this wide assortment of friends, Gus has many interesting tales to tell of the trouble people go to to get his arrowheads. One in particular happened a while back when *HMS Duke of York* was scheduled to dock at Norfolk. R. Stafford, a member of the British crew, sent Gus a telegram for an order of heads before the ship docked. It was up to Gus to have the heads in Norfolk when the ship arrived, because the ship's stay was limited, and he did.

In addition to making arrowheads, Gus Adkins himself is an avid archer. His collection of bows might well be coveted by bow hunters everywhere. He has a birch bow made and used by the Ute Indians in western Utah. The arrows are fletched with eagle feathers and tipped with steel heads from the tires of ambushed settler's wagons. Arrows are grooved to allow blood to seep from the wounds of game, so it would not be bloodshot. Also, he has a bow by Rieckard, a famous bow maker of London, who has been dead nearly 100 years.

His favorite hunting bow is made from two woods, hickory and lemonwood—from Spain—and it is reinforced with fiberglass. He owns a cross-bow, too. He estimates that it could kill a deer, or other game animal a city block away, if it were a legal type of hunting weapon.

Adkins attributes his success in the manufacture of arrowheads to his motto, "quality above all". But in addition, he believes that the great strides forward the archery pastime has made in the last few years have had much to do with the demand for his product. "People are looking forward to different and more sporting ways to take game, and they are finding the "sportingest" of all methods to be the bow and arrow. And regardless of what some people believe about the inhumane side of bow hunting, death to the game animal comes just as quickly and as painlessly from a bow and steel-tipped arrow as it does from high-powered rifles and shotguns." Adkins explains.

Says Adkins of his hobby, "Of course, this is just a hobby for me. I'm a welder by trade. Someday, however, I hope to turn my hobby into a full-time occupation." Fulltime production will greatly increase the number of arrowheads turned out, but the sporting goods market can stand the increase and much more, too. People today are realizing more and more that the thrill of the kill is not half so important as the stalking and method used to make that kill. Certainly there is no method of hunting which gives to the game a better chance to escape and to the hunter the chance to display his skill than hunting with bow and arrow.



Commission photo by Kesteloo

Fish plus water don't always add up to good fishing, says the author of "Mathematical Fishing." In fact, sometimes the more fish you have the poorer the fishing.

MATHEMATICAL FISHING

By ROBERT G. MARTIN, *Fish Biologist*

THE MODERN TREND towards mathematical reasoning in major fields of science is causing trouble in fisheries management. But it isn't that this trend is too complex for the average fisherman to comprehend. On the contrary, the trouble is that he has been oversold on this mathematical method of reasoning and now must be unsold before we can make progress in the fisheries field.

But it isn't the higher mathematical formulae that are stumping the experts; it is the basic elementary formula, two plus two equal four. The experts are finding it difficult to convince the fishermen that this basic equation doesn't always work when it comes to better fishing.

Applying this basic equation to any average pond, lake or stream, the two plus two's of fishing add up in the average fisherman's mind to, "fish plus water equal good fishing. Thus, the more fish you have the better fishing you'll have." Perhaps this misconception of what it takes to make good fishing came from the old and outmoded adage, "always throw back the little fish, and only fish for the big ones." Whatever the origin, it is wrong, and there is enough error in these statements to keep a lot of creels empty. Two plus two just don't always add up to four when it comes to fishing. In fact, in many instances, fishing becomes progressively worse as the number of fish present increases.

Take Farmer Brown's pond, for instance. Remember about 10 years ago when he first built that three-acre pond on his place? Although he built it primarily as a water supply reservoir for his cattle, a free allotment of largemouth bass and bluegill fingerlings was obtained from the Fish and Wildlife Service for stocking. The

following years a few of his close friends were permitted to fish the pond. Caught lots of fish, too. Some big enough to brag about for a month.

The boys thought they knew a good thing when they saw it, so they talked Farmer Brown into restricting fishing to their own little clique. In a few years, fishing declined and the boys lost interest. You could catch a tubful of bream, sometimes, but the biggest one wouldn't crowd a five inch skillet. "No fish in there; been fished out" was a typical remark directed at this once popular fishing site.

Then there's the Country Club Lake that the Rod and Gun Club purchased a few years back. These fellows were only interested in bass fishing and only the big ones at that. So, they made "blue laws" for the Club that only 14-inch bass and above could be kept. Everyone seemed satisfied with the fishing at first, but then some of the boys began complaining that they couldn't catch any bass large enough to take home. There was no trouble landing plenty of 9-12-inch bass; but these wouldn't prove to the little lady that the boys had actually been fishing. What was wrong? It couldn't be that the bass were "fished out" because the men consistently caught small ones.

Let's evaluate these two cases in the light of modern fisheries research findings. As often happens in small ponds without adequate management, the bream had got out of hand in Farmer Brown's pond. Perhaps his cattle had access to the pond during the spawning season of the bass—April and May—and had destroyed their nests. Unfavorable weather conditions during this short spawning period could likewise have been responsible

for the lack of reproduction. Regardless of the cause, this failure of the bass to reproduce directly resulted in the unexpected survival of thousands of small bream, which normally would have been eaten by young bass. From that point on, the bream ran the whole show. The farmer's well-meaning friends had unwittingly contributed to the overabundance of bream by restricting the fishing to a few friends. This low fisherman harvest combined with the decreased bass predation allowed more bream to survive than the food supply of the pond would support at a normal rate. The bream stunted, and for all practical purposes the pond was not suitable for fishing even though there was a large number of fish present.

Following the old fisherman's arithmetic, the Rod and Reel Club was justified in having such stringent regulations pertaining to the bass harvest. They thought that more fish meant better fishing. After all, they were throwing the bass back to grow big! However, the bass were not up on their higher mathematics, and consequently did not conform to this equation in their growth rate.

By selectively fishing for only the larger bass over a period of several years the boys had created an artificial

situation in the pond. They had almost eliminated the granddaddies and left the pond with a legacy of smaller bass of almost equal size. Since there was no harvest of these smaller bass under 14 inches, these fish continued to increase in numbers. Finally, they became so abundant in proportion to the amount of forage present that they ceased to grow at their former rapid rate. In fact, many of them grew at such a slow rate that either disease or old age killed them before they attained the prize proportions desired by the fishermen.

After examining the case histories of these two bodies of water, it becomes apparent that something is wrong with the old formula for achieving good fishing. In each case, the increase in numbers of fish was definitely not associated with improved fishing. The experience gained by reviewing these two cases should serve to point out some of the more important factors contributing to good fishing. In arriving at a formula for good fishing, it must be remembered to include proper spawning conditions, abundant food, and adequate fisherman harvest. All of these conditions are of utmost importance in the life equation of the bass and in future intelligent fish management, if we are to continue to have good fishing throughout the years.

*Useful on Quiz Shows **

*A flock of ships is called a fleet,
A fleet of sheep is called a flock,
A flock of girls is called a bevy,
A bevy of wolves is called a pack,
A pack of thieves is called a gang,
A gang of angels is called a host,
A host of porpoise is called a shoal,
A shoal of fish is called a school,
A school of buffalo is called a herd,
A herd of seals is called a pod,
A pod of whales is called a gam,
A gam of lions is called a pride,
A pride of children is called a troop,
A troop of partridges is called a covey,
A covey of beauties is called a galaxy,*

*A galaxy of ruffians is called a horde,
A horde of rubbish is called a heap,
A heap of oxen is called a drove,
A drove of blackguards is called a mob,
A mob of worshipers is called a congregation,
A congregation of theater-goers is called an audience,
An audience of peacocks is called a muster,
A muster of doves is called a flight,
A flight of larks is called an exaltation,
And if they are starlings it's murmuration,
A murmuration of bees is called a swarm,
A swarm of foxes is called a skulk,
A skulk of pigs is called a sty,
A sty of dogs is called a kennel,
A kennel of cats is called a nuisance.*

* Reprinted from the May 17 issue of the RICHMOND TIMES-DISPATCH.

A CLOSER LOOK AT THE KILLERS

(Continued from page 7)

population counterbalancing.

If predation by minks upon muskrats or by horned owls upon bobwhites is heavy, losses from other enemies tend to diminish in proportion; in the absence of the minks or the horned owls, losses from other animals preying upon muskrats or bobwhites tend to increase. The muskrats, themselves, can be the greatest killers of other muskrats in places lacking their typical predatory enemies. And, if losses of early-born young are unusually severe, there may be, in compensation, not only prolonged late breeding but also high rates of survival of the late-born young. Conversely, if losses of early-born young are unusually light, the season's breeding may not only cease early but the loss rates of the late-born may also be exceedingly high, and so on.

While it doesn't always happen that all loss from predation or from any other cause of death to prey animals is wholly compensated, at any one time or ever, far more natural compensating occurs than people are in the habit of thinking. That is the supreme reason why so many prey species may thrive despite our misgivings or our expressed wonder that they can exist at all under the pressure put upon them by predators.

Instead of taking it for granted that the eating of an egg or the killing of a young animal by a predator must mean one less of the prey species to be around by the opening of the hunting season or one less for the next year or the like, we should keep in mind that such loss from predation *may* be chiefly a *symptom*, occurring incidental to some of the things that really dominate populations.

To me, the great fascination of animal predation as a subject for study has lain in the variety of its manifestations of the timeless laws of life. Predators are among those wild creatures that maintain their integrity as wild creatures regardless of human meddling and man's ridiculous propensity for judging wildlife as good or bad according to moral standards of his own invention that he hardly pretends to adhere to, himself. Many predators are surely among the wildest and freest of all creatures. Of our native wildlife, the predators, too, include some of the rarest, the most beautiful and the most superbly adapted animals. To some of us, they offer highly-regarded antidotes to the banalities of a civilization top-heavy with people.

I don't maintain that it may never be necessary to protect our economic or other interests from predators of one kind or another. Let us do whatever needs to be done in this respect, but, in so doing, let us weigh values and avoid senseless extremes.

MUSHROOMS AND TOAD STOOLS

(Continued from page 8)

3) Avoid all mushrooms which are classified as unwholesome or whose edibility is in question, even though non-poisonous. If this rule is followed, there is no way in the world that a person can get into trouble picking wild mushrooms.

4) Learn to know the *Boleti*. This is a group of fine mushrooms that lacks gills and has a spongy type of lower cap. This entire group of fleshy mushrooms can be safely gathered and eaten, with the single exception of one species, the bitter boletus, which is classed as unwholesome. This mushroom is bitter to the taste when freshly picked and should be avoided. It is the only inedible Bolete of eastern North America.

5) Lastly, but *not* least, learn to know the deadly *Amanitas*—then avoid anything or any stage of a mushroom that looks like one.

One of the best all-around mushrooms to eat is, of course, the common field or meadow mushroom. This species known as *Agaricus campestris* is the same mushroom as is found in the stores and which is grown commercially in mushroom cellars. The plant can be rather easily identified in fields and pastures, by the white cap, pink gills, ring in stem but no volva or cup at the base. The pink gills of the young mushrooms soon turn dark with age and turn almost black in several days. The flesh is best when the plant is fairly tender. Species can be positively identified by the ring on the stem and the free pink gills.

The best time to gather *Agaricus* is after a rain in well-fertilized fields and pastures. Lawns and closely mowed golf greens are excellent locations for them.

In Europe, the annual gathering of edible fungi and a general interest in mushrooms are pretty much of a tradition. During World War II, I witnessed people all over France, Belgium, Holland, Germany, gathering mushrooms by baskets for the table. Most were eaten fresh, some canned, and some dried for winter use in soups and gravies. In one cleanly-swept beech forest in Europe, I saw a wagon-load of wild mushrooms going to the market to help feed the starving people of bombed-out Hanover.

Although I am far from an expert on fungi, I have over the past 30 years managed to get well-acquainted with several dozen wonderfully delicious mushrooms and find myself and friends not hesitant to eat them.

And speaking of flavor, nothing to me compares with the exquisite taste of well-prepared, young, fresh wild mushrooms from the fields and woods. They are a true delicacy and their wonderful gastronomic qualities were well known and date as far back as the forgotten times



of the Middle Ages. And man is not the only living creature which likes these plants. Wildlife of every description feeds on one type of mushroom or another, with the red squirrel heading the list as a mushroom gourmet.

The picking of mushrooms and the identification of them is a hobby of utmost fascination. Here is a botanical challenge to anyone who likes to romp the fields

and woods and meadows after rain in August and September and October. With a good book in hand, an analytical and inquisitive mind, a great deal of fun can be had by studying these wonderful but peculiar non-chlorophyll bearing plants. Try it this summer and see if you are not enriched by the experience. Perhaps, too, you can add to your storehouse of nature knowledge, as well as a distinctive touch to your table.

WHEN JAMESTOWN WAS A COLONY

(Continued from page 17)

ful howl from the ridges. The timber wolf with its long, strong legs, large body, bushy tail, and erect pointed ears looked much like a police dog, but unlike the dog, it proved to be one of the worst enemies of the settlers. The extinction of the timber wolf in Virginia was probably due largely to the enormous bounties, often paid in tobacco, offered for the killing of a wolf during the early days of the Jamestown colony.

As early as 1696, there is a record in a court order book as follows: "To Colonel William Byrd for four wolves caught in a pitt by his man, Georges, at 300 each is 1200 pounds of tobacco, 96 cask. To ditto for three killed with a gun by Robin, 200 each." The last wolf was recorded in Virginia around 1910.

John Smith, who roamed the New World far and wide, reported that "Of beastes the chiefe are deare." they went on to give an amusing description of the flying squirrel and the opossum: "A small beast they haue . . . we call them flying squirrels, because spreading their legs, and so stretching the largeness of their skins, that they haue bin seene to fly 30 or 40 yards. An opassom hath an head like a Swine, and a taile like a Rat, and is the bigness of a Cat. Vnder her belly shee hath a bagge, wherein she lodgeth, carrieth, and sucketh her young."

Along the shores of the Chesapeake Bay, they very likely saw the now extinct heath hen, a cousin of the western prairie chicken. This bird, with its rust brown tuft of feathers on each side of the neck, is believed to have roamed the shores of the Chesapeake, but was more common farther north. The last heath hen disappeared from Martha's Vineyard in Massachusetts in 1931.

On one trip up the Potomac River, Sir Thomas Argall saw an eastern bison "big as Kine . . . heavy, slow and not so wild as other beasts of the wildernesse." These great creatures of the wild, which disappeared around 1798, were often called "buffalo" and are believed to have lacked the hump common to other American bison.

Following the fading footsteps of the bison, was the elk, another large, hooved, noble animal of the forests. This antlered big game animal was a common sight to the early Virginians but vanished in 1855. The elk has since been restocked in recent years by the Virginia Game Commission and several small herds are found in the Giles, Botetourt, and Bland County area.

As the settlers went deeper and deeper into the forests they probably saw martens and fishers, so valuable for their fur. The marten, much like a weasel in form, was smaller than a house cat, with rich, soft pelage, a long

lithe body, and short limbs. The fisher, a large marten, was about the size of a fox, and was often called a "black fox." This creature was so fierce that it has been said that it was a match for any animal in the forest up to the size of a deer. No authentic record of the marten has been found for Virginia but most mammalogists give its range as being as far south as Virginia.

Quite often, the settlers saw beaver building their dams in a forest stream. As the slightest noise, they flapped their broad, flat tails to warn their brothers of danger, and whisked away into the underbrush on the stream bank. This woodland creature also disappeared from its native haunts in Virginia around 1910 because of overtrapping, but has been restocked in recent years by the Game Commission. The animals are coming back, and last spring, a limited trapping program was allowed.

Another forest creature, common in Colonial times was the southern fox squirrel, last reported seen in the Commonwealth in 1895. Larger and heavier than the eastern gray squirrel, the species has large limbs, and coarse fur, which at different stages is buff, gray and black in color. Today, in a number of mountain counties we can still see the arboreal northern fox squirrel, searching the ground for food, and can hear its hoarse bark as he scampers aloft when danger threatens.

Of the smaller animals which formerly paraded our forests, fields, and woodlands, perhaps the Virginia varying hare or "snowshoe" rabbit and porcupine most startled the early colonists. As the leaves fell from the trees and the first snows blanketed the land, these varying hares scampered through the fields with ease on their own built-in "snowshoes!" A heavy coat of hair covering their large hind feet and spreading toes formed pad-like snowshoes which enabled this rabbit to run freely in the snow. The porcupine's needle-like quills pricked many a settler before the colonists developed a healthy respect for this "armed" creature of the wild.

This quick flash-back to the pages of history only goes to show how dramatic was the downfall of much of our wildlife. Man has surely paid a big price for early colonization and later empire development. While it is true that we can never restore some of our wildlife, we can learn much from what has happened in the past and what has to be done in the future to safeguard our wildlife. Only through wise-use of all natural resources and a deeper appreciation and understanding for all "life" and its needs can our wildlife be truly perpetuated.



FISH YOUR FARM PONDS

After a nation-wide survey of farm pond experts, Everett A. Houghton, in "How to Revive Your Farm Pond," in the April issue of the *Fisherman Magazine*, makes a number of suggestions for making the farm pond productive and pleasurable. He sums up these recommendations:

"Finally, we will always do well to keep in mind a few simple recommendations which all experts agree will give us better pond fishing.

"1. We should fish even harder for our bluegills than we do for our bass. And we should make sure that everyone who fishes our pond keeps every bluegill he catches, no matter how small.

"2. We should watch our bass population carefully, and perhaps restock occasionally when the balance seems in doubt. A few more of these predators stocked in time may save hours and dollars later on.

"3. In establishing or re-establishing our pond, we should not allow too great a lag between the stockings of forage fish (bluegills) and predatory fish (bass), enabling the former to become predominant.

"4. We should open up our pond to responsible fishermen in order to insure that it is fished sufficiently. The greater majority of ponds fail because of underfishing, not overfishing.

"5. Last but not least, we should fish our pond ourselves as often as possible, in order to keep close tabs on what is going on."

GOOD SHOT

Did you ever stop to wonder how bird shot could be made so round and perfect, yet be so very small? No, tiny midgets do not sit pouring hot lead into minute forms. Brother, would the price of shot go up if they were made this way?

The big ammunition companies

have "shot towers." The process of "dropping shot" has been practiced for hundreds of years, yet few people know about it. Molten lead pours through perforated "skillets in the sky" from these towers. This drop transforms it into spherically perfect pellets. The Winchester shot tower is nine stories high.

SNAKE COLLECTING HOBBY OF COLONIAL HEIGHTS LAD

Ben Keys, 22-year-old Colonial Heights reptile collector, goes in for snake hunting in a big way. In just



A cottonmouth captured by Keys near Colonial Heights.

one day last spring, he captured a cottonmouth moccasin and 11 other snakes near Colonial Heights.

E. B. Smoot, zoological instructor in the Petersburg schools, interested Keys in the reptile kingdom some eight years ago, and the lad has been on the prowl for snakes ever since.

With snake-hook in hand, Keys takes to the water in his canoe and relentlessly pursues all types of snakes in a mile and one half acre off Route 1, South, near Petersburg. Heading into the swamps, Keys captures snakes as they are sunning on logs and often during their nocturnal feedings.

Recently, he caught a copperhead, a brown water snake, a blotched water snake, and many other common water snakes for his collection in the same area.

TENNESSEE TRIES NEW DEER-REPELLER DEVICE

The Tennessee Game and Fish Commission is experimenting with an explosion machine which has possibilities of proving useful to scare wild deer out of agricultural areas where they often damage valuable crops, according to the National Wildlife Federation. Intermittent explosions are caused by the constant dripping of water on carbide which produces a gas in an explosion chamber. Once every 3 to 5 minutes, this gas builds up. It is lighted by a constantly-burning pilot light and explodes with a "boom" similar to that of a 16-gauge shotgun. It has a barrel which emits flame at each shot, acting as an additional frightener. The machine is hung from the lower limbs of a tree on a swivel; thus, each firing turns the machine to give sounds from different directions. One charge of carbide and water will operate the machine automatically for about 30 hours.

GAME LAW CONVICTIONS INCREASING

During the month of May, the law enforcement staff of the Commission of Game and Inland Fisheries obtained 1022 convictions for game and inland fish and dog law infractions, according to Webb Midyette, chief, law enforcement division.

Convictions were obtained for 587 fishing law infractions, 21 game law violations, and 414 dog law violations. This, according to Midyette, is the largest number of convictions during any one month in the history of the Commission.

It is believed that no more violations than usual took place in the month of May. The increased number of convictions, said Midyette, is indicative of the continuing increased efficiency of our game warden staff.

NACEP MEETS AT GATLINBURG

The National Association of Conservation, Education and Publicity met at its annual meeting at Hotel Mountain View, Gatlinburg, Tennessee, May 10-13 with the Tennessee Department of Conservation and the North Carolina Wildlife Resources Commission acting as host states.

Conservation education representatives from more than 30 different states were represented at the meeting with total registration close to 75. The Virginia Game Commission was represented by J. J. Shomon.

The entire field of conservation education was covered during the 3-day informal meeting with such things as the departmental magazine, radio work, television, motion picture production, youth conservation programs, etc., taking the spotlight. On Tuesday afternoon a bus tour was taken through the Great Smoky Mountains National Park. An opportunity was given members to see the new Cherokee Indian Reservation in North Carolina. An evening outdoor picnic in the Smokies was a highlight affair with a 500 pound black bear entertaining the visitors between mealtime and storytelling.

Convention delegates elected Miss Juanita Mahaffey of Oklahoma as the new president for the coming year. J. J. Shomon was named to the Board of Directors.

The Awards Committee made three national awards: Youth Education to Julian Smith for youth camp work in Michigan; Book Award to R. W. Eschmeyer for his *True-To-Life Stories on fish and game*; Film Award to Missouri Conservation Commission for its outstanding movie "Bobwhite Through the Years."



NACEP group poses for camera at Gatlinburg. The Fishing Derby attracted 420 entries from the City of Richmond.

FISH DERBY ATTRACTS 452 PEOPLE, 205 FISH

Some 452 people from 2 to 76 years of age gave the first annual Father's Day Fishing Derby co-sponsored by Thalhimers and the Department of Parks and Recreation a royal send-off June 21 in Richmond.

Scores of fathers and sons, mothers and daughters, and entire families flocked to Swan Lake in Byrd Park for a four-hour fishing spree. In the sweltering 90-degree-plus heat, 108 of the 452 participants caught a share of the 205 fish-take.

In less than a minute after the Derby officially opened at 1:30 P.M., Jerry Meadow hauled in a catfish weighing just a few ounces less than the two-pound "whopper" which copped the \$50 savings bond grand prize for J. R. O'Connell.



Youngest fisherman in the lot, two-year-old James Edmund Messer, threw down his pole in disgust and went away empty handed. But 2½-year-old Lynn Carol Jordan, youngest fisherman to make a catch, crowed with glee as she hauled in a 6-inch bass weighing all of $\frac{1}{2}$ an ounce! Four generations of the Shelton family, headed by 76-year-old A. D. Shelton, tried their luck with poles and worms.

Almost without exception, the fish were returned to the water after being weighed by Derby officials. The lucky fishermen who captured one of the 50 fish tagged by the Commission of Game and Inland Fisheries hastened to Thalhimers the following week to redeem their tags for \$5.00

worth of merchandise. All tagged fish caught between June 21 and Labor Day will entitle the fisherman to the \$5.00 merchandise prize.

SELF-HUNTING DOGS PRESENT PROBLEM TO GAME IN STATE

The role of the self-hunting dog as a game predator in Virginia is often over-looked, according to Chester Phelps, chief of the game division.

The number of dogs which are allowed to roam at will is so large that even if only an occasional animal destroyed some species of wildlife, the total over a year would represent a significant per cent, said Phelps.

In some sections of the state west of the Blue Ridge, particularly in southwest Virginia, it is known that dogs in a two-month period during the winter killed more deer than the hunters bagged in certain sections during the legal open season. This is duplicated in other sections. It is impossible to estimate how the reproductive rate of deer in eastern Virginia is affected by dogs pursuing the does in early spring. Many qualified observers think this factor is one of the greatest in holding deer populations in eastern Virginia at a relatively low level, said Phelps.

Studies made in recent years indicate that most of the nesting losses in turkeys are caused by desertion. It is also known that a wild turkey hen will very often desert a nest if she is flushed from it early in the season. Nesting losses also represent one of the most serious factors in holding our turkeys to a low rate of increase. It is known that dogs are responsible for a large percentage of turkey nesting losses and desertion, said Phelps.

BACK COVER

"Breaks of the Cumberland"

Photo by Flournoy of the
Va. St. Chamber of Commerce

Field Force Notes



BULLER CLARIFIES POLICY ON FISH POND CONSTRUCTION

As a result of press reports that the Commission, upon approval of Governor Battle, would begin expansion of public fish pond construction activities around July 1, a large number of applications are being received in Commission headquarters, said G. W. Buller, chief of the fish division.

Buller declared that the Commission is definitely not in the market for the purchase of pond sites, since sportsmen's organizations, other groups, and county governing bodies have in the past deeded to the Commission suitable land for the construction of ponds. This same policy will be adhered to in the future, said Buller.

Since there are few areas in the state suitable for public fish pond construction which would give the maximum service to the public, the Commission must be extremely careful in the selection of sites, said Buller, the state's highest authority on fish pond construction.

WHO SAID "IT'S FISHED OUT?"

Roy Halstead, warden supervisor from Creeds, Virginia, sent in the photo of himself, Governor Battle, and an unidentified friend, who caught the bass in Back Bay last May.

The significance of the picture of



Governor Battle (right) helps Warden Supervisor Ray Holstead (left) and unknown companion hold string of Back Bay Bass.

the parties large catch of "lunker bass" is that during the same morning the fish were caught, two other Commission employees had tried their best to eat one bass for use in a movie scene for the fishing film "Bass Waters." They didn't even get a nibble, and left Halstead, the Governor and party with this remark: "You may as well go on home, those fish aren't hitting anything, and you won't eat a thing. We know, we tried it."

Said Halstead as he displayed the picture of the bass: "My arm is still sore from catching those bass that wouldn't bite."

RADFORD ARSENAL DEER DOING WELL

Major Rood, executive officer of the Radford Arsenal, sent in the accompanying picture of a buck and



A buck and doe turned over to Rodford Arsenal last year. These are same deer pictured page 23, October 1952 issue of VIRGINIA WILDLIFE.

doe deer which were originally released on the grounds of the Arsenal by Game Commission personnel last fall. The deer were picked up originally as orphans and were raised at the Cumberland Game Farm before being turned over to the Virginia Wildlife Research Unit at Blacksburg, and later to the Arsenal.

This is one of the best photographs ever made of a doe and buck deer in a wild state and we wish to congrat-

ulate the photographer on his excellent picture.

FEDERATION OPENS NEW NATURE CAMP

Additional outdoor camping facilities were added to the growing list of Virginia camp sites as the Virginia Federation of Garden Clubs dedicated a new nature camp near Vesuvius, Virginia, in the George Washington National Forest June 16.

Mrs. W. W. Levi, president of the Federation, introduced the guests and welcomed them to the "Open House" at the dedication ceremonies at which Mrs. J. H. Adams was the principal speaker.

A building, including the mess hall and recreation hall, was named the "Lillian Schilling Building" in honor of Mrs. Fred Schilling who was instrumental in getting the camp started.

Ladies assemble for opening of Nature Camp at Vesuvius. Bottom: Mrs. J. H. Adams addresses the ladies and guests of the Federation.



Wildlife Questions and Answers

Ques.: Of what value is the common toad?

Ans.: The common toad eats 10,000 garden pests a year. Its work is worth about \$20.00.

Ques.: The other day, I saw a man shoot a vulture. What harm does this bird do?

Ans.: None. Vultures are health-protectors in worm lands where they eat carrion, being guided to their food not by smell but by sight. Its amazing vision is an important factor in the vulture's longevity.

Ques.: Do women hold any of the world's records for precision shooting?

Ans.: Yes, they certainly do. The new world's record holder for precision shooting with a rifle is Mrs. Olive Walker, Ilion, New York, a housewife. Shooting with remarkable concentration, Mrs. Walker registered a group of 10 shots at 100 yards which measured .3268 inches, a record which is close to shooting perfection.

Ques.: How did the short-eared owl get its name?

Ans.: The short-eared owl is so called because its ear tufts are barely visible.

Ques.: Does an ant eat solid food?

Ans.: Yes, in a sense. The ant puts solid food in a pocket back of its jaws. The food is squeezed and the juice is swallowed, the rest being thrown away.

Ques.: What happened to the black rat which was so common at one time in America?

Ans.: The black rat came to North America with the first colonists and rapidly spread throughout the country. The Norway rat came to this country nearly 100 years later, but competition between the two became so keen that the black rat soon became rare and disappeared entirely in some sections of the country.

Ques.: Is it true that you can tell whether an animal is of a prey species or a predator species by its eyes?

Ans.: In some instances, yes. Prey species like the deer tend to have their eyes on sides of their heads providing a broad field of vision. The eyes of hunters like the bobcat are generally in front of the face so as to provide the best vision of the prey they are pursuing.

Ques.: Isn't there some way a person can tell which male birds help the female brood her eggs?

Ans.: The color of the male bird is a good indication of whether or not he helps with brooding the eggs. If he is colored in conspicuously like the female, he takes his regular turn. If he is brilliantly colored, he stays away from the nest.

Ques.: When do tree frogs hibernate?

Ans.: Tree frogs hibernate when cold weather begins and sleep continuously until the return of higher temperature. And if

worms never returned, the sleep would continue until the little creatures died from exhaustion of vital organs.

Ques.: I understand that fresh water clams are parasites. Is this true?

Ans.: Yes. Fresh water clams spend the early part of their lives as parasites on fishes.

Ques.: Sometime ago, someone told me that the horned toad is not a toad at all. If not, what is it?

Ans.: The horned toad is not a toad, but a lizard. It does not lay eggs, but gives birth to living young.

Ques.: My young son came home the other night and asked me a question I can't answer. What bird has wings but can't fly?

Ans.: A bird which has wings and yet can not fly is the penguin.



"Guess what? Roy here just found an otter slide."

Ques.: Is the carp native to the United States?

Ans.: No. The carp was introduced into this country in 1877 when R. Hessel, for the United States Fish Commission, brought 345 carp to this country. These carp were placed in ponds in Washington, D. C., and were later distributed to 25 states. Today the carp is found in all parts of Virginia in almost all fresh water streams of any size that are not too cold such as brook trout streams. Carp are found in all states and territories of the United States, with the exception of Alaska.

Ques.: Is a special license required to rear ring-necked pheasants in captivity?

Ans.: Yes. You must obtain a pheasant breeder's permit from the Game Commission. If you raise less than 50 per year, the permit may be issued free; if you raise more than 50 per year, it will be issued at a cost of five dollars per fiscal year. This permit will authorize you to raise pheasants in captivity and they may be disposed of as food, for breeding purposes, or stocking purposes.

Ques.: If another person accompanies me while I am fishing with a gill or fyke net in the Nottoway River, does that person have to have a license?

Ans.: If that person gives you any assistance whatsoever in handling the net, taking the fish from the net, or handling the boat in order that the net may be properly fished, then he is a party to the fact and should have a license.

Ques.: Are puffballs edible and how big do they grow?

Ans.: Yes, puffballs are one of the "better-eating" groups of fungi, and are especially good when young and fresh. These fungi grow to various sizes, some obtaining the size of a grapefruit. The largest one known to us was found in New York State in 1877, and measured four feet across and five feet high. When sliced, it supplied 500 people with steaks one inch by four inches by eight inches.

Ques.: Don't termites die each year even if they have plenty of wood to eat?

Ans.: No. Termites can live 30 or more years.

Ques.: What is the purpose of the "seed-tree" law?

Ans.: Leaving seed trees helps provide new crops of timber for the future. Seeds from these trees will germinate and continue growing if wild fires are kept from the woods. Keep our woodlands green and productive.

Ques.: What is the size of an ostrich egg?

Ans.: An ostrich egg weighs about three pounds and holds approximately as much as a dozen and one-half chicken eggs.

Ques.: Is it true that the United States has the world's largest bats?

Ans.: No. The biggest bats in the world are found in the Old World tropics and are popularly called "flying foxes." They have a wing-span of about five feet.

Ques.: How are the premature young in the opossum transferred to the pouch after birth?

Ans.: According to a study by Harold C. Reynolds, the newborn young of the opossum, ranging anywhere from 4 to 25 days and weighing less than a paper match each at birth, get transferred to the pouch by themselves with the use of four limbs which act like tiny swimmers. Using overhead motion, the newborn pull themselves hand over hand over the mother's belly until they reach the inside of the pouch, traveling usually only the needed distance of 4 or 5 centimeters. The speed with which these tiny blind hairless possums reach the pouch is amazing. One was timed with a stopwatch and it made the trip in 16.5 seconds.

